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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

CHANG, JON CARLTON

ART UNIT

PAPER NUMBER

2623

DATE MAILED: 08/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/924,985

Applicant(s)

YOSHII, HIROTO

Examiner

Jon Chang

Art Unit

2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/26/01.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Specification

1. The disclosure is objected to because of the following informalities:

The status of U.S. Patent Application 09/112,448, mentioned in the specification at page 2, line 2 should be updated if appropriate.

On page 12, line 16 and page 13, lines 10 and 20 of the specification, "route" should be changed to "root".

Appropriate correction is required.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claim 11 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 11 is drawn to a "program". Computer programs *per se* are not patentable subject matter.

Claim Rejections - 35 USC § 112

4. Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is not clear what statutory class of invention claim 11 belongs. It appears to be a hybrid claim. It appears to consist of a program, a method (causing the computer to function...) as well as an apparatus (linear combination feature amount generating means, etc.). If Applicant wishes to avoid this rejection and cover "computer program product" type subject matter, the Examiner suggests the claim be rewritten as follows::

1) Have the claim drawn to a computer program product comprising a computer readable medium (or similar language), 2) Indicate that a computer program for controlling a computer is stored on the medium, 3) State that the program is for dividing a feature space in which a point set given as learning patterns to form a classification tree on the basis of the learning patterns, 4) and that the computer program product comprises program code (means) for performing the functions (as recited in the body of the claim) .

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-4, 6-7 and 10-11 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,351,561 to Iyengar.

As to claim 1, Iyengar discloses an information processing method of dividing a feature space in which a point set given as learning patterns is present to form a classification tree on the basis of the learning patterns, comprising:

the linear combination feature amount generation step of generating a new feature amount by a linear combination of the feature amounts of the learning patterns (column 3 line 67 to column 4, line 5; note that constants a_1 , a_2 , etc., at each node are the set of coefficients c_1 , c_2 , etc., of the vector V , column 4, lines 7-15; the weight function of the vector V is computed using a training set, i.e., learning patterns, column 4, lines 43-50);

the hierarchization pre-preprocessing step of hierarchizing, in advance, the new feature amount generated in the linear combination feature amount generation step (column 3, lines 6-20); and

the classification tree generation step of generating a classification tree on the basis of the learning patterns hierarchized in the hierarchization pre-processing step (column 3, lines 6-20).

Regarding claim 2, Iyengar discloses the method according to claim 1, wherein in the linear combination feature amount generation step, a coefficient of the linear combination is selected from a fixed set of coefficients (column 3, lines 41-49; column 4, lines 8-15);

With regard to claim 3, Iyengard discloses the method according to claim 1, wherein in the hierarchization pre-processing step, the feature amount is hierarchized on the basis of a normal vector of the hyperplane formed by the linear combination in

the linear combination feature amount generation step and a hyperplane having the normal vector (column 4, lines 20-28).

Regarding claim 4, Iyengar discloses the method according to claim 3, wherein the hyperplane used in the hierarchization pre-processing step includes a hyperplane perpendicular to the feature amount axis (column 3, lines 6-9).

As to claim 6, Iyengar discloses the method according to claim 1, further comprising the recognition step of recognizing a newly input pattern using the classification tree formed in the classification tree formation step (column 8, line 55 to column 9, lines).

As to claim 7. The method according to claim 1, wherein in the hierarchization pre-processing step, the feature amount is hierarchized on the basis of a range of values which can be taken by the learning patterns (column 8, lines 2-29).

Claim 10 is an apparatus claim corresponding to the method of claim 1. Iyengar discloses a computer-based apparatus for performing the method (column 9, lines 6-31).

Claim 11 is drawn to a program which corresponds to the method of claim 1. Iyengar discloses a program for performing the method (column 9, lines 20-31).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iyengar.

Regarding claim 9, Iyengar does not disclose that the learning pattern is any one of an image pattern, a speech pattern, and a character pattern. The patent does not restrict the learning patterns for any particular, specific use, but refers to "generic" reference sets. However, the patent does mention the applicability of classifiers to pattern recognition (column 1, line 45). The Examiner also takes Official Notice that image patterns, speech patterns, or character patterns are well known in the classification art. It would have been obvious to one of ordinary skill in the art to utilize any one of these types of patterns, depending on the desired use of the classifier.

9. Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Iyengar and U.S. Patent 6,058,205 to Bahl et al. (hereinafter "Bahl").

Regarding claim 5, Iyengar discloses the method according to claim 1, wherein in the hierarchization pre-processing step, a hierarchical structure is formed such that the structure is hierarchized for each feature amount (column 3, lines 12-14) and that a classification tree is formed (column 3, lines 18-20), but does not disclose that in the classification tree formation step, a classification efficiency is calculated from a hierarchical structure of each feature amount at each node, and a feature amount used on the basis of the classification efficiency is determined. However, this is well known in

the art as evidenced by Bahl (column 5, lines 39-40; column 6, lines 1-38; the efficiency is determined based on the entropy, equation (2)). This allows hierarchical construction with a minimal amount of computations by minimizing the average entropy of the class distributions at the terminal nodes (column 1, lines 58-62; column 2, lines 22-24). Therefore, it would have been obvious to one of ordinary skill in the art to modify Iyengar's invention according to Bahl's teachings.

As to claim 8, Iyengar does not disclose that in the hierarchization pre-processing step, the feature amount is hierarchized on the basis of a profile of the learning patterns. However, this is well known in the art as evidenced by Bahl. Bahl utilizes the projection of the training vectors (learning patterns) onto the linear discriminant (column 5, lines 55-63). This ultimately allows for the reduction of the average entropy in the repartitioned spaces. Therefore, it would have been obvious to one of ordinary skill in the art to modify Iyengar's invention according to Bahl's teachings.

References Cited

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 5,142,593 to Kasano discloses an apparatus and method for classifying feature data at high speed which uses a linear combination to determine an equidistant plane between vectors. No classification tree is generated.

U.S. Patent 5,634,087 to Mammone et al. discloses a neural tree network which allows for diagonal discriminants.

U.S. Patent 5,745,601 to Lee et al. teaches a binary decision tree that uses a linear combination of segmentation robustness features at each node.

U.S. Patent 5,978,497 to Lee et al. teaches binary decision tree classifiers which utilize linear feature combination at each node.

U.S. Patent 6,009,199 to Ho teaches generating oblique classification trees by taking linear combination of features so that hyperplanes are not parallel to the feature axes.

"A Connectionist Approach to Generating Oblique Decision Trees" by Setiono et al. teaches generating oblique decision trees which classify patterns by testing on linear combinations of input attributes


"HOT: Heuristics for Oblique Trees" by Iyengar teaches subject matter similar to U.S. Patent U.S. Patent 6,351,561.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jon Chang whose telephone number is (703)305-8439. The examiner can normally be reached on M-F 8:00 a.m.-6:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703)308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jon Chang
Primary Examiner
Art Unit 2623

Jon Chang
August 16, 2004